

# Claims

- [c1] 1. A suspension system comprising:
- a lockout mechanism including a valve mechanism and a valve actuating assembly;
  - a valve mechanism housing; and
  - a resilient member disposed between the valve mechanism and the valve mechanism housing;
- the valve mechanism slidably mounted along the valve mechanism housing, the valve mechanism separating a first fluid chamber from a second fluid chamber and controlling fluid flow therebetween;
- the valve actuating assembly operably switching the valve mechanism between an open position in which fluid flow between the first and second fluid chambers is permitted and a closed position in which fluid flow between the first and second fluid chambers is blocked;
- the resilient member configured to be deformable by the valve mechanism as the valve mechanism is slidably displaced by an increasing pressure in the first fluid chamber, the increasing pressure biasing the valve mechanism toward the closed position, the sliding valve mechanism configured to collide against the valve actuating assembly when a blow-off pressure is reached in the first fluid

chamber switching the valve mechanism from the closed position to the open position.

- [c2] 2.The suspension system of claim 1 wherein the valve mechanism further comprises:  
a valve seat slidably mounted along the valve mechanism housing; and  
a valve displaceable relative to the valve seat and positionable against the valve seat in the closed position, the valve switchable between the open and closed positions, the valve of the sliding valve mechanism configured to collide against the valve actuating assembly when the blow-off pressure is reached in the first fluid chamber.
- [c3] 3. The suspension system of claim 2 wherein the resilient member is disposed between the valve seat and the valve mechanism housing.
- [c4] 4. The suspension system of claim 3 wherein the valve seat and resilient member are formed integrally.
- [c5] 5. The suspension system of claim 2 further comprising a seal disposed between the valve mechanism and the valve mechanism housing.
- [c6] 6.The suspension system of claim 5 wherein the seal is disposed between the valve seat and the valve mechanism housing.

- [c7] 7.The suspension system of claim 2 further comprising a valve spring configured to bias the valve against the valve seat in the closed position.
- [c8] 8.The suspension system of claim 2 wherein the valve further comprises:  
a valve head;  
a valve stem; and  
a valve spring associated with the valve stem and configured to bias the valve head against the valve seat in the closed position;  
the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the blow-off pressure is reached in the first fluid chamber.
- [c9] 9.The suspension system of claim 1 further comprising;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.
- [c10] 10.The suspension system of claim 9 wherein the valve mechanism housing forms a portion of the first hollow tube.

- [c11] 11. The suspension system of claim 9 wherein the valve mechanism housing forms a portion of the compression piston assembly.
- [c12] 12. The suspension system of claim 9 wherein the suspension system further comprises a second hollow tube in fluid communication with the first hollow tube, wherein the valve mechanism housing forms a portion of the second hollow tube.
- [c13] 13. The suspension system of claim 1 wherein the valve actuating assembly is operably mounted to and displaceable relative to the valve mechanism housing.
- [c14] 14. The suspension system of claim 13 wherein the valve actuating assembly further comprises:  
a driver displaceable relative to the valve mechanism housing to operatively engage the valve mechanism; and  
an actuator operatively connected to the driver.
- [c15] 15. The suspension system of claim 14 wherein the driver further includes a follower  
and the actuator further comprises:  
a knob connected to the actuator and operable by a rider; and  
a cam operatively engaging the follower.

- [c16] 16. The suspension system of claim 14 wherein the valve mechanism further comprises:  
a valve seat slidably mounted along the valve mechanism housing; and  
a valve displaceable relative to the valve seat and positionable against the valve seat in the closed position, the valve switchable between the open and closed positions, the valve of the sliding valve mechanism configured to collide against the driver when the blow-off pressure is reached in the first fluid chamber.
- [c17] 17. The suspension system of claim 16 wherein the valve stem is configured to collide against the driver.
- [c18] 18. The suspension system of claim 16 wherein the resilient member is disposed between the valve seat and the valve mechanism housing.
- [c19] 19. The suspension system of claim 18 wherein the valve seat and resilient member are formed integrally.
- [c20] 20. The suspension system of claim 18 further comprising a seal disposed between the valve seat and the valve mechanism housing.
- [c21] 21. The suspension system of claim 20 wherein the re-

silient member and the seal are formed integrally.

[c22] 22. The suspension system of claim 20 wherein the resilient member, the seal and the valve seat are formed integrally.

[c23] 23. The suspension system of claim 20 further comprising;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.

[c24] 24. The suspension system of claim 23 wherein the valve mechanism housing forms a portion of the first hollow tube.

[c25] 25. The suspension system of claim 23 wherein the valve mechanism housing forms a portion of the compression piston assembly.

[c26] 26. The suspension system of claim 23 wherein the suspension system further comprises a second hollow tube in fluid communication with the first hollow tube, wherein the valve mechanism housing forms a portion of the second hollow tube.

[c27] 27. The suspension system of claim 18 further comprising

ing a valve spring configured to bias the valve against the valve seat in the closed position.

[c28] 28. The suspension system of claim 18 wherein the valve further comprises:

a valve head;

a valve stem; and

a valve spring associated with the valve stem and configured to bias the valve head against the valve seat in the closed position;

the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the blow-off pressure is reached in the first fluid chamber.

[c29] 29. A valve mechanism for a suspension device, the suspension device including a valve mechanism housing and a valve stop member, the valve mechanism comprising:

a valve seat; and

a valve;

the valve mechanism slidably mounted along the valve mechanism housing, the valve mechanism separating a first fluid chamber from a second fluid chamber and controlling fluid flow therebetween;

the valve displaceable relative to the valve seat and switchable between an open position in which fluid flow

between the first and second fluid chambers is permitted, and a closed position in which fluid flow between the first and second fluid chambers is blocked, the valve configured to be positionable against the valve seat in the closed position;

the valve mechanism slidably displaceable by an increasing pressure in the first fluid chamber, the increasing pressure biasing the valve toward the closed position, the valve of the sliding valve mechanism configured to collide against the valve stop member when a blow-off pressure is reached in the first fluid chamber switching the valve from the closed position to the open position.

[c30] 30. The suspension system of claim 29 further comprising a resilient member disposed between the valve seat and the valve mechanism housing and configured to be deformable by the valve mechanism as the valve mechanism is slidably displaced by an increasing pressure in the first fluid chamber.

[c31] 31. The suspension system of claim 30 wherein the valve seat and resilient member are formed integrally.

[c32] 32. The suspension system of claim 30 further comprising a seal disposed between the valve seat and the valve mechanism housing.



- [c33] 33. The suspension system of claim 32 wherein the resilient member and the seal are formed integrally.
- [c34] 34. The suspension system of claim 32 wherein the resilient member, the seal and the valve seat are formed integrally.
- [c35] 35. The suspension system of claim 32 further comprising;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.
- [c36] 36. The suspension system of claim 35 wherein the valve mechanism housing forms a portion of the first hollow tube.
- [c37] 37. The suspension system of claim 35 wherein the valve mechanism housing forms a portion of the compression piston assembly.
- [c38] 38. The suspension system of claim 35 wherein the suspension system further comprises a second hollow tube in fluid communication with the first hollow tube, wherein the valve mechanism housing forms a portion of the second hollow tube.

[c39] 39. The suspension system of claim 30 further comprising a valve spring configured to bias the valve against the valve seat in the closed position.

[c40] 40. The suspension system of claim 30 wherein the valve further comprises:  
a valve head;  
a valve stem; and  
a valve spring associated with the valve stem and configured to bias the valve head against the valve seat in the closed position;  
the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the blow-off pressure is reached in the first fluid chamber.

[c41] 41. A suspension system comprising:  
a flow restrictive mechanism including a valve mechanism and a valve actuating assembly;  
a valve mechanism housing; and  
a resilient member disposed between the valve mechanism and the valve mechanism housing;  
the valve mechanism slidably mounted along the valve mechanism housing, the valve mechanism separating a first fluid chamber from a second fluid chamber and

controlling fluid flow therebetween;  
the valve actuating assembly operably switching the valve mechanism between an open position in which fluid flow between the first and second fluid chambers is permitted and a restrictive position in which less fluid flow is permitted between the first and second fluid chambers than in the open position;  
the resilient member configured to be deformable by the valve mechanism as the valve mechanism is slidably displaced by an increasing pressure in the first fluid chamber, the increasing pressure biasing the valve mechanism toward the closed position, the sliding valve mechanism configured to collide against the valve actuating assembly when a threshold pressure is reached in the first fluid chamber switching the valve mechanism from the restrictive position to the open position.

- [c42] 42. The suspension system of claim 41 wherein the valve mechanism further comprises:  
a valve seat slidably mounted along the valve mechanism housing; and  
a valve displaceable relative to the valve seat and positionable toward the valve seat in the restrictive position, the valve switchable between the open and restrictive positions, the valve of the sliding valve mechanism configured to collide against the valve actuating assembly

when the restrictive pressure is reached in the first fluid chamber.

- [c43] 43. The suspension system of claim 42 wherein the resilient member is disposed between the valve seat and the valve mechanism housing.
- [c44] 44. The suspension system of claim 43 wherein the valve seat and resilient member are formed integrally.
- [c45] 45. The suspension system of claim 42 further comprising a seal disposed between the valve mechanism and the valve mechanism housing.
- [c46] 46. The suspension system of claim 45 wherein the seal is disposed between the valve seat and the valve mechanism housing.
- [c47] 47. The suspension system of claim 42 further comprising a valve spring configured to bias the valve toward the valve seat in the restrictive position.
- [c48] 48. The suspension system of claim 42 wherein the valve further comprises:
  - a valve head;
  - a valve stem; and
  - a valve spring associated with the valve stem and config-

ured to bias the valve head toward the valve seat in the restrictive position;  
the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the restrictive pressure is reached in the first fluid chamber.

[c49] 49. The suspension system of claim 48 wherein the valve further comprises an orifice permitting restricted fluid flow between the first and second fluid chambers.

[c50] 50. The suspension system of claim 41 further comprising;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.

[c51] 51. The suspension system of claim 50 wherein the valve mechanism housing forms a portion of the first hollow tube.

[c52] 52. The suspension system of claim 50 wherein the valve mechanism housing forms a portion of the compression piston assembly.

[c53] 53. The suspension system of claim 50 wherein the suspension system further comprises a second hollow tube

in fluid communication with the first hollow tube,  
wherein the valve mechanism housing forms a portion of  
the second hollow tube.

[c54] 54. The suspension system of claim 41 wherein the valve  
actuating assembly is operably mounted to and dis-  
placeable relative to the valve mechanism housing.

[c55] 55. The suspension system of claim 54 wherein the valve  
actuating assembly further comprises:  
a driver displaceable relative to the valve mechanism  
housing to operatively engage the valve mechanism; and  
an actuator operatively connected to the driver.

[c56] 56. The suspension system of claim 55 wherein the  
driver further includes a follower  
and the actuator further comprises:  
a knob connected to the actuator and operable by a  
rider; and  
a cam operatively engaging the follower.

[c57] 57. The suspension system of claim 55 wherein the valve  
mechanism further comprises:  
a valve seat slidably mounted along the valve mechanism  
housing; and  
a valve displaceable relative to the valve seat and posi-  
tionable toward the valve seat in the restrictive position,

the valve switchable between the open and restrictive positions, the valve of the sliding valve mechanism configured to collide against the driver when the restrictive pressure is reached in the first fluid chamber.

[c58] 58. The suspension system of claim 57 wherein the valve stem is configured to collide against the driver.

[c59] 59. The suspension system of claim 57 wherein the resilient member is disposed between the valve seat and the valve mechanism housing.

[c60] 60. The suspension system of claim 59 wherein the valve seat and resilient member are formed integrally.

[c61] 61. The suspension system of claim 59 further comprising a seal disposed between the valve seat and the valve mechanism housing.

[c62] 62. The suspension system of claim 61 wherein the resilient member and the seal are formed integrally.

[c63] 63. The suspension system of claim 61 wherein the resilient member, the seal and the valve seat are formed integrally.

[c64] 64. The suspension system of claim 61 further compris-

ing;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.

[c65] 65. The suspension system of claim 64 wherein the valve mechanism housing forms a portion of the first hollow tube.

[c66] 66. The suspension system of claim 64 wherein the valve mechanism housing forms a portion of the compression piston assembly.

[c67] 67. The suspension system of claim 64 wherein the suspension system further comprises a second hollow tube in fluid communication with the first hollow tube, wherein the valve mechanism housing forms a portion of the second hollow tube.

[c68] 68. The suspension system of claim 59 further comprising a valve spring configured to bias the valve toward the valve seat in the restrictive position.

[c69] 69. The suspension system of claim 59 wherein the valve further comprises:  
a valve head;



a valve stem; and  
a valve spring associated with the valve stem and configured to bias the valve head toward the valve seat in the restrictive position;  
the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the restrictive pressure is reached in the first fluid chamber.

[c70] 70. A valve mechanism for a suspension device, the suspension device including a valve mechanism housing and a valve stop member, the valve mechanism comprising:  
a valve seat; and  
a valve;  
the valve mechanism slidably mounted along the valve mechanism housing, the valve mechanism separating a first fluid chamber from a second fluid chamber and controlling fluid flow therebetween;  
the valve displaceable relative to the valve seat and switchable between an open position in which fluid flow between the first and second fluid chambers is permitted and a restrictive position in which less fluid flow is permitted between the first and second fluid chambers than in the open position, the valve configured to be positionable toward the valve seat in the restrictive position;  
the valve mechanism slidably displaceable by an increas-

ing pressure in the first fluid chamber, the increasing pressure biasing the valve toward the restrictive position, the valve of the sliding valve mechanism configured to collide against the valve stop member when a threshold pressure is reached in the first fluid chamber switching the valve from the restrictive position to the open position.

[c71] 71. The suspension system of claim 70 further comprising a resilient member disposed between the valve seat and the valve mechanism housing and configured to be deformable by the valve mechanism as the valve mechanism is slidably displaced by an increasing pressure in the first fluid chamber.

[c72] 72. The suspension system of claim 71 wherein the valve seat and resilient member are formed integrally.

[c73] 73. The suspension system of claim 71 further comprising a seal disposed between the valve seat and the valve mechanism housing.

[c74] 74. The suspension system of claim 73 wherein the resilient member and the seal are formed integrally.

[c75] 75. The suspension system of claim 73 wherein the resilient member, the seal and the valve seat are formed

integrally.

- [c76] 76. The suspension system of claim 73 further comprising;  
a first hollow tube; and  
a compression piston assembly slidably mounted in the first hollow tube and displaceable relative thereto to increase the pressure in the first fluid chamber.
- [c77] 77. The suspension system of claim 76 wherein the valve mechanism housing forms a portion of the first hollow tube.
- [c78] 78. The suspension system of claim 76 wherein the valve mechanism housing forms a portion of the compression piston assembly.
- [c79] 79. The suspension system of claim 76 wherein the suspension system further comprises a second hollow tube in fluid communication with the first hollow tube, wherein the valve mechanism housing forms a portion of the second hollow tube.
- [c80] 80. The suspension system of claim 71 further comprising a valve spring configured to bias the valve toward the valve seat in the restrictive position.

- [c81] 81. The suspension system of claim 71 wherein the valve further comprises:  
a valve head;  
a valve stem; and  
a valve spring associated with the valve stem and configured to bias the valve head toward the valve seat in the restrictive position;  
the valve stem of the valve in the sliding valve mechanism configured to collide against the valve actuating assembly when the restrictive pressure is reached in the first fluid chamber.
- [c82] 82. The suspension system of claim 81 wherein the valve further comprises an orifice permitting restricted fluid flow between the first and second fluid chambers.